

PHOTOSYNTHESIS AND RESPIRATION BY THE SYMBIOTIC ASSOCIATION BETWEEN A CORAL REEF SPONGE AND ITS MACROALGAL SYMBIONT. *Memoirs of the Queensland Museum* 44: 606. 1999:- In the association between the haplosclerid sponge *Haliclona cymiformis* and the red macroalga *Ceratodictyon spongiosum*, the algal thallus comprises the bulk of the organism, while the sponge fills in the spaces between the algal branchlets and forms a thin layer around the outside of the association. The alga is exposed only at the very tips of the branches of the association. Measurements of photosynthesis and respiration of the symbiotic association have shown that this association makes a significant contribution to the primary productivity of the fringing reefs of One Tree Lagoon, southern Great Barrier Reef, in areas where few large primary producers (corals or algae) can live.

Light entering the branches of the association is rapidly attenuated and, as a result, the compensation and saturating irradiances are high; approximately 750 and 315 $\mu\text{mol photons m}^{-2}\text{s}^{-1}$ respectively. Photoinhibition at higher irradiances does not occur. Maximum rates of photosynthesis reach 435 $\mu\text{mol O}_2\text{mg chl a}^{-1}\text{h}^{-1}$ during summer, while respiration consumes up to 220 $\mu\text{mol O}_2\text{mg chl a}^{-1}\text{h}^{-1}$. These rates

decrease by about half during the winter. Photosynthetic and respiratory rates were unaffected by changes in ambient oxygen concentration or by nutrient enrichment with nitrogen or phosphorus. Prolonged periods of heavy shading lead to an increase in pigment concentration in the alga, but no changes in maximum photosynthetic or respiratory rates were found when compared to control samples. There were no significant differences in the rates of respiration or photosynthesis between cultured *C. spongiosum* and the intact *Haliclona/Ceratodictyon* association, so it was not possible to formulate a model as to how respiration was partitioned between the partners in the association. □ *Porifera, Haliclona cymiformis, Ceratodictyon spongiosum, symbiosis, photosynthesis, respiration, oxygen concentration, nutrient enrichment, photoadaptation, partitioning of respiration.*

Donelle A. Trautman* (email: dtrautma@bio.usyd.edu.au), School of Biological Sciences and Biotechnology, Murdoch University, Murdoch, Western Australia, 6150, Australia; *Present address: Department of Science (Biological Sciences), University of Sydney, Biological Sciences A12, NSW 2006 Australia; 1 June 1998.